

A new cavernicolous species of crab of the genus *Balssiathelphusa* Bott, 1969 (Crustacea, Brachyura, Gecarcinucidae) from eastern Borneo

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ABSTRACT

A fourth species of gecarcinucid freshwater crab of the genus *Balssiathelphusa* Bott, 1969, is described from a cave system in eastern Kalimantan, Indonesia in Borneo. It is closest to *B. cursor* Ng, 1986, from Kalimantan, but can easily be distinguished from congeners by its relatively wider carapace, elongated ambulatory legs and characteristic male first gonopod structure. Although found only in caves, it is not regarded as a troglobite because its eyes are not reduced and the cornea are fully pigmented.

RÉSUMÉ

Une nouvelle espèce cavernicole de crabe du genre Balssiathelphusa Bott, 1969 (Crustacea, Brachyura, Gecarcinucidae) originaire de l'est de Bornéo.

Une quatrième espèce de crabe d'eau douce appartenant au genre *Balssiathelphusa* Bott, 1969 est décrite d'un système de grottes du Kalimantan oriental, Indonésie, à Bornéo. Apparentée à *B. cursor* Ng, 1986, du Kalimantan, elle se distingue facilement d'autres espèces du genre par sa carapace relativement plus large, ses pattes ambulatrices allongées et une structure caractéristique du premier gonopode chez le mâle. Bien que trouvée dans des grottes, elle n'est pas considérée comme troglobie, car ses yeux ne sont pas réduits et leur cornée est pleinement pigmentée.

KEY WORDS

Balssiathelphusa,
caves,
eastern Kalimantan,
Borneo,
new species.

MOTS CLÉS

Balssiathelphusa,
grottes,
Kalimantan oriental,
Bornéo,
espèce nouvelle.

INTRODUCTION

The exploration of the Mangkalihat Peninsula in Borneo, eastern Kalimantan, by French speleologists (Degouve *et al.* 2002) found an unusual species of long-legged freshwater crab from one of the largest caves in the area. These specimens proved to belong to an undescribed species of gecarcinucid belonging to the genus *Balssiathelphusa* Bott, 1969.

The new species, here named *Balssiathelphusa phasma* n. sp., is described, figured and compared with congeners.

MATERIAL AND METHODS

Specimens examined are deposited in the Muséum national d'Histoire naturelle (MNHN), Paris; and the Zoological Reference Collection (ZRC) of the Raffles Museum of Biodiversity Research, National University of Singapore. The terminology used follows essentially that in Ng (1988) and Ng *et al.* (2008). The abbreviations G1 and G2 are used for the male first and second gonopods, respectively. Measurements provided (in millimeters) are of the carapace width and length, respectively.

SYSTEMATICS

Family GECARCINUCIDAE Rathbun, 1904

Genus *Balssiathelphusa* Bott, 1969

Balssiathelphusa phasma n. sp.

(Figs 1-3)

TYPE MATERIAL. — **Holotype.** Indonesia, Expédition Spéléologique à Bornéo, main gallery of Gua Kambing, Mount Batu, Mangkalihat Peninsula, east Kalimantan, 1°09.444'N, 117°28.479'E, 454 m asl, J. Lips coll., 21.VII.2002, 1 ♂, 23.1 × 18.9 mm, (MNHN-IU-2013-13148).

Paratypes. Same data as holotype, 1 ♂ damaged, carapace cracked, all appendages detached, 18.1 × 15.1 mm, 1 ♂ dismembered, badly damaged, carapace detached, sternum broken, all appendages detached, damaged, 23.5 × 18.8 mm, (ZRC 2014.0092).

ETYMOLOGY. — The species name “*phasma*” is derived from the Latin for “spirit”, alluding to the ghost-like

appearance (pale coloration and elongated pereopods) of the species. The name is used as a noun in apposition.

TYPE LOCALITY. — Eastern Kalimantan, Borneo, Indonesia.

DISTRIBUTION. — Known only from the type locality.

COLOUR. — An overall pale yellow when freshly preserved.

DIAGNOSIS. — Carapace subovate, broader than long (Fig. 1A, B); epigastric cristae low, rugose, without sharp cristae; postorbital cristae barely discernible (Fig. 1A, B). Frontal margin distinctly sinuous (Fig. 1A, B); frontal median triangle distinct (Fig. 1C, D); external orbital tooth acutely triangular, separated from anterolateral margin by V-shaped cleft (Fig. 1A, B); epibranchial tooth distinct; anterolateral margin distinctly convex (Fig. 1A, B); chelipeds elongate (Fig. 1A); ambulatory legs very long, margins of meri subcristate, gently serrated, without subdistal spine or tooth (Figs 1A; 2D); abdomen distinctly T-shaped, somite 6 longer than broad with distinctly concave lateral margins; telson longer than broad, shorter than somite 6 (Fig. 2A-C); G1 slender, subterminal segment gradually tapering with distal half relatively stout; terminal segment short, *c.* 0.18 times length of subterminal segment, conical, gently curving upwards (Fig. 3A-C); G2 *c.* 0.8 times length of G1, distal segment short, *c.* 0.1 times length of basal segment (Fig. 3D).

DESCRIPTION

Carapace subovate, broader than long; dorsal surface gently convex; areas adjacent to antero- and posterolateral margins covered with distinct oblique striae, rest of surface relatively smooth, glabrous (Fig. 1A, B). Regions discernible, cervical grooves distinct, relatively deep, joining distinct H-shaped median depression (Fig. 1A, B). Epigastric cristae low, rugose, without sharp cristae, separated by deep Y-shaped groove; postorbital cristae barely discernible (Fig. 1A, B). Frontal margin distinctly sinuous, separated by shallow; gradually confluent with supraorbital margin (Fig. 1A, B); frontal median triangle distinct, lateral margins distinctly cristate, dorsal margin sharp but not distinct, formed by bend and series of sharp striae (Fig. 1C, D). Supra- and infraorbital margins entire, finely granular to smooth (Fig. 1A, B). External orbital tooth prominent, acutely triangular; inner margin confluent with supraorbital margin; outer margin gently sinuous; separated from anterolateral margin by distinct

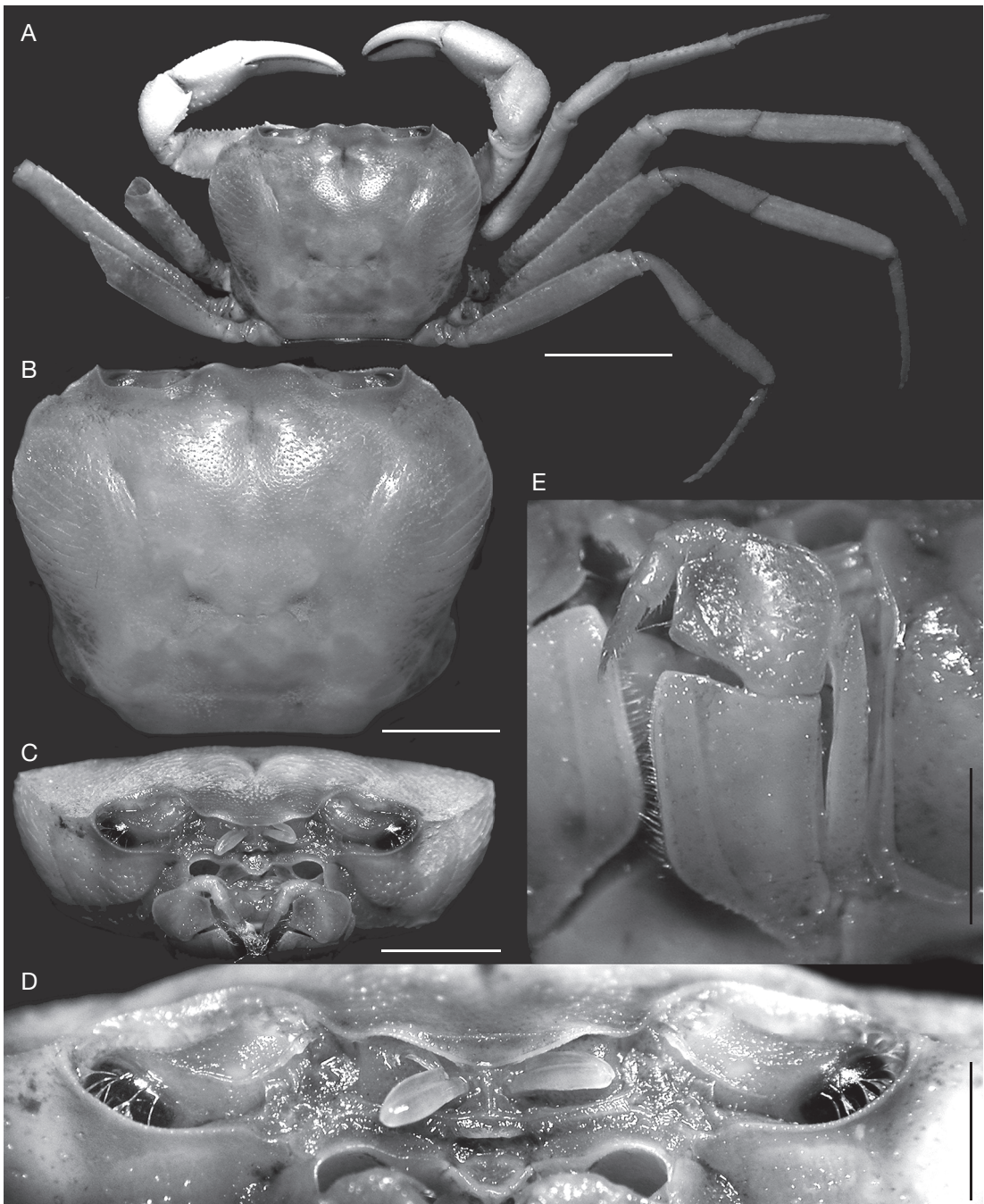


FIG. 1. — *Balssiathelphusa phasma* n. sp., holotype male, 23.1 × 18.9 mm, (MNHN-IU-2013-13148), east Kalimantan: **A**, overall dorsal view; **B**, dorsal view of carapace; **C**, frontal view of carapace; **D**, frontal view showing frontal median triangle; **E**, left third maxilliped. Scale bars: A, 1.0 mm; B, C, 0.5 mm; D, E, 0.25 mm.

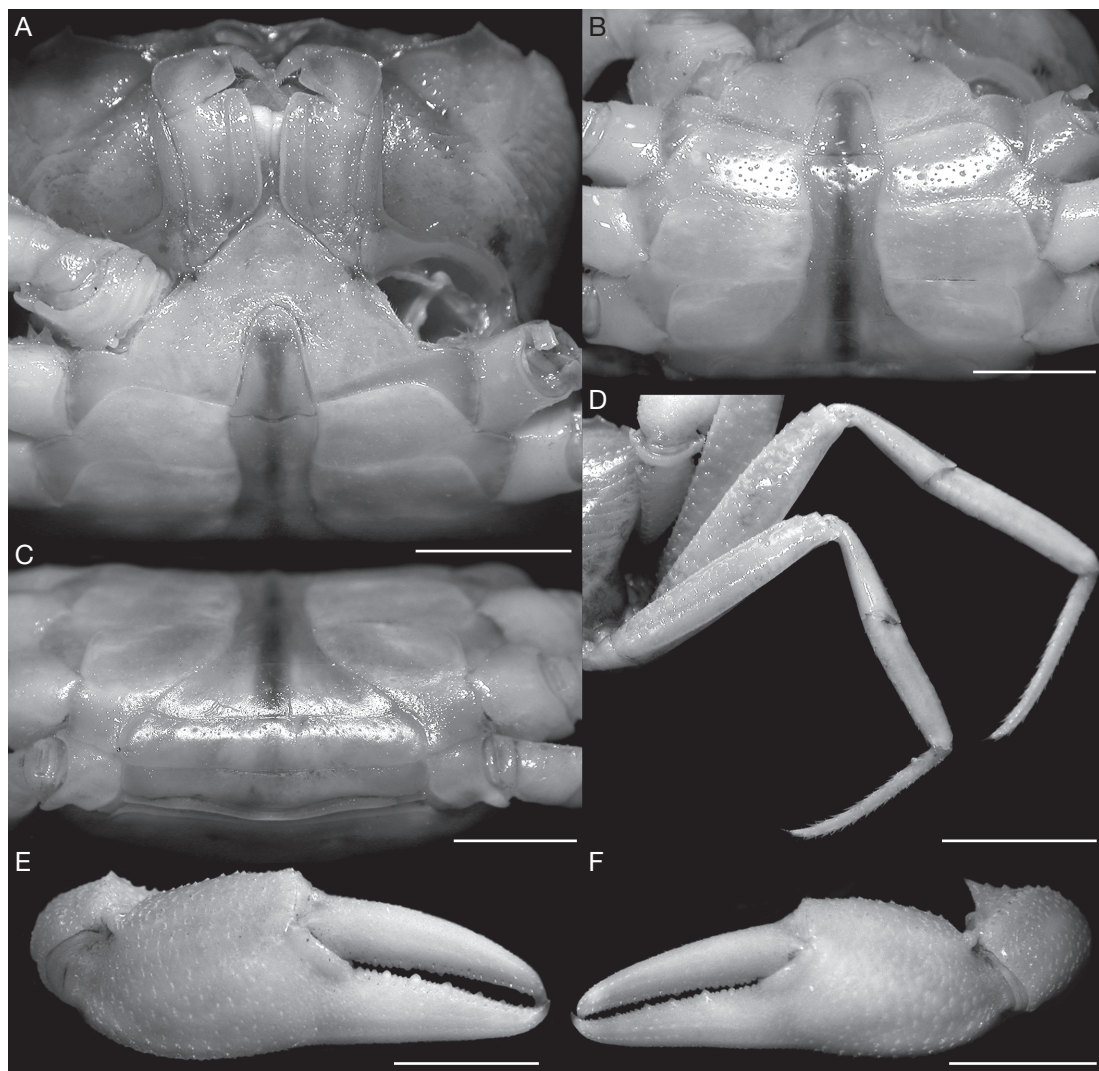


FIG. 2. — *Balssiathelphusa phasma* n. sp., holotype male, 23.1 × 18.9 mm, (MNHN-IU-2013-13148), east Kalimantan: **A**, anterior thoracic sternum, male abdominal somite 6 and telson; **B**, anterior thoracic sternum, male abdominal somites 4-6 and telson; **C**, posterior thoracic sternum and male abdominal somites 1-4; **D**, right third and fourth ambulatory legs; **E**, outer view of right chela; **F**, outer view of left chela. Scale bars: A-C, E, F, 0.5 mm; D, 1.0 mm.

V-shaped cleft (Fig. 1A, B). Epibranchial tooth distinct; anterolateral margin distinctly convex, lined with small rounded granules, striae (Fig. 1A, B). Posterolateral margin gently sinuous, distinctly converging towards gently concave posterior carapace margin (Fig. 1A, B). Sub-branchial, suborbital, subhepatic, pterygostomial regions granulated,

rugose (Fig. 1C). Antennules folding transversely (Fig. 1C). Anterior margin of epistome straight; posterior margin with broadly triangular median lobe with rounded tip, lateral margins sinuous, margins around efferent channels deeply concave (Fig. 1C, D). Third maxillipeds relatively smooth, almost glabrous except for inner margins; merus with

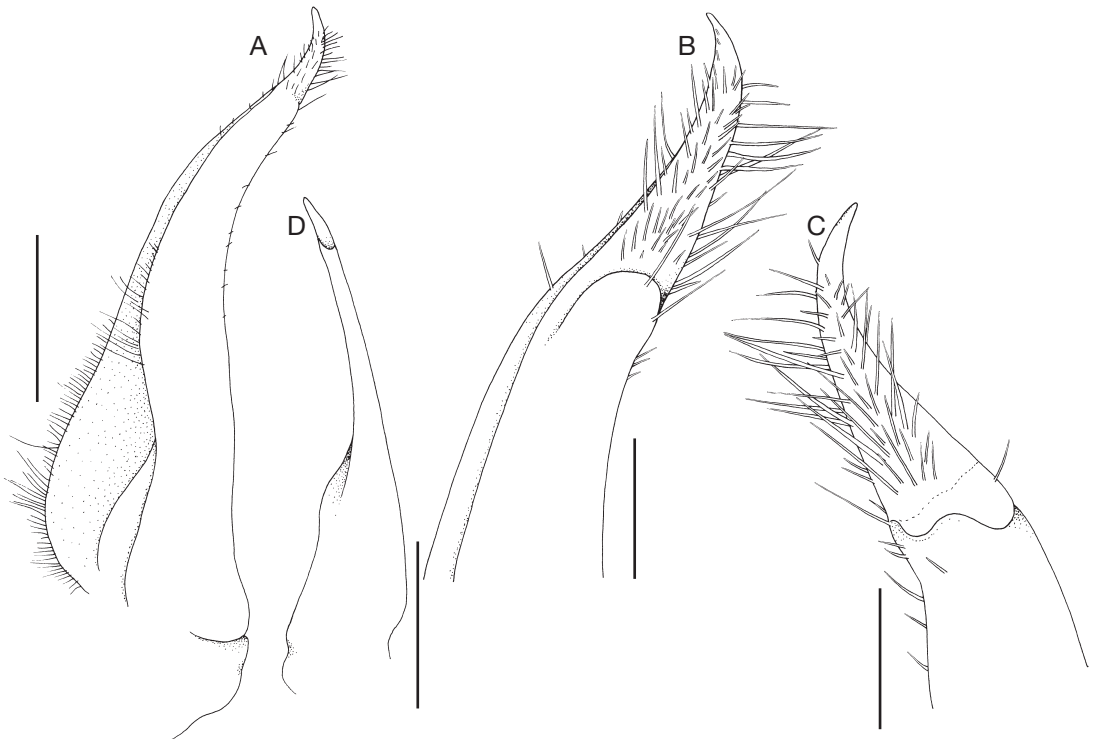


FIG. 3. — *Balssiathelphusa phasma* n. sp., holotype male, 23.1 × 18.9 mm, (MNHN-IU-2013-13148), east Kalimantan: **A**, ventral view of left G1; **B**, ventral view of left G1 terminal segment; **C**, dorsal view of left G1 terminal segment; **D**, left G2. Scale bars: A, D, 1.0 mm; B, C, 0.5 mm.

median depression, anteroexternal margin rounded but not auriculiform; ischium quadrate, longer than broad, with distinct slightly oblique submedian sulcus; exopod slender, reaching to midpoint of merus, with long multiarticulate flagellum (Fig. 1E). Mandibular palp with bilobed terminal segment.

Thoracic sternum relatively smooth; relatively narrow transversely (Fig. 2A). Somites 1–4 completely fused, without trace of median sutures; surface of sternite 3 medially depressed; sternoabdominal cavity relatively deep, reaching to imaginary line joining anterior margin of coxae of chelipeds (Fig. 2A). Male abdominal locking mechanism with rounded tubercle on median part of sternite 5.

Chelipeds elongate; chelae asymmetrical, right slightly larger; outer surfaces rugose (Figs 1A; 2E, F). Basis-ischium squarish, anterior margin with low granules. Margins of merus lined with sharp

granules, with distinct subdistal sharp tooth on anterior margin (Fig. 1A). Outer surface of carpus with small sharp granules; inner distal angle with long sharp spine, outer margin lined with small sharp granules (Fig. 1A). Chela relatively slender; outer surface covered with small sharp granules (especially on margins) or rugose; fingers longer than palm, curved distally to corneous tip, cutting edges with small teeth, denticles (Figs 1A; 2E, F).

Ambulatory legs very long, second pair longest; outer surface rugose (Figs 1A; 2D). Dorsal, ventral margins of meri subcristate, gently serrated with low, uneven granules of differing sharpness; subdistal angle distinct but not armed with spine or tooth (Figs 1A; 2D). Carpus elongate, lateral margins covered with very small sharp granules, with low submedian crista on outer surface (Fig. 2D). Propodus subrectangular, elongate, with small sharp

granules on margins (Fig. 2D). Dactylus very long, slightly downcurved, with numerous strong, anteriorly directed spines on dorsal, ventral margins; tip corneous.

Abdomen distinctly T-shaped (Fig. 2A-C). Somite 1 very narrow longitudinally, reaching to base of coxa of fourth ambulatory leg; somite 2 broadly rectangular, reaching to base of coxa of fourth ambulatory leg; somite 3 broadly subrectangular with distinctly convex lateral margins, entirely covering thoracic sternite 8 when closed (Fig. 2C); somites 4 trapezoidal with gently convex to straight lateral margins (Fig. 2B, C); somite 5 subquadrate with concave lateral margins (Fig. 2B); somite 6 longer than broad, lateral margins distinctly concave (Fig. 2A, B). Telson triangular, longer than broad, lateral margins gently concave; shorter than somite 6 (Fig. 2A).

G1 slender, gently sinuous; subterminal segment gradually tapering with distal half relatively stout; terminal segment short, *c.* 0.18 times length of subterminal segment, conical, tapering to sharp tip, gently curving upwards in situ, surfaces covered with numerous long setae which do not obscure margins (Fig. 3A-C). G2 *c.* 0.8 times length of G1; basal segment long; distal segment short, *c.* 0.1 times length of basal segment (Fig. 3D).

DISCUSSION

Three species of *Balssiathelphusa* Bott, 1969, are currently recognised: *B. cursor* Ng, 1986 (eastern Kalimantan, Borneo), *B. natunaensis* Bott, 1970 (Natuna Island, South China Sea), and *B. sucki* (Balss, 1937) (type species by original designation) (southeast Sumatra) (Bott 1969; Ng *et al.* 2008). The genus is unusual among freshwater crabs in that these three species occur in widely separated sites in southern Sumatra, Natunas Island and eastern Borneo; without taxa between the three localities. Ng (1986: 211-213) discussed the taxonomy of the genus at length and suggested that the genus is either an old taxon with the current species being relicts or is polyphyletic with the observed differences being the result of convergence. Certainly the following characters that

now define the genus are not always diagnostic by themselves: the presence of a distinct frontal median triangle, a distinctly T-shaped male abdomen, a G1 with a strongly upcurved terminal segment that is covered with dense, long setae, and a G2 which has a very short distal segment (*sensu* Bott 1970; Ng 1986).

The present specimens of *B. phasma* n. sp. from eastern Kalimantan can clearly be assigned to *Balssiathelphusa* as defined above. Not surprisingly, they are most similar to *B. cursor* from Wanariset near Balikpapan in eastern Kalimantan, some 200 km to the south-southwest of the Mangkalihat Peninsula. However, *B. phasma* n. sp. can easily be separated by numerous characters: the carapace is proportionately wider, with the anterolateral margins distinctly convex and appearing more ovate (Fig. 1A, B) (versus carapace less wide and more quadrate, with the anterolateral margins gently convex in *B. cursor* [Ng 1986: fig. 1]); the epibranchial tooth is distinct (Fig. 1A, B) (versus almost undiscernible and appears confluent with anterolateral margin in *B. cursor* [Ng 1986: fig. 1]); the frontal margin is distinctly sinuous (Fig. 1A, B) (versus gently sinuous to almost straight in *B. cursor* [Ng 1986: fig. 1]); the ambulatory legs, notably the merus, are relatively much longer (Figs 1A; 2D) (versus distinctly shorter in *B. cursor* [Ng 1986: fig. 1]); the male abdominal telson and somite 6 are proportionately longer (Fig. 2A, B) (versus proportionately shorter in *B. cursor* [Ng 1986: fig. 1]); the distal half of the subterminal segment of the G1 is relatively stouter (Fig. 3A) (versus relatively more slender in *B. cursor* [Ng 1986: fig. 2A, B, G]); the distal part of the terminal segment of the G1 is gently curved upwards (Fig. 3A-C) (versus prominently bent upwards in *B. cursor* [Ng 1986: fig. 2A-D]); and the distal segment of the G2 is relatively shorter (Fig. 3D) (versus relatively longer in *B. cursor* [Ng 1986: fig. 2F]).

Balssiathelphusa phasma n. sp. superficially resembles members of the wholly Bornean gecarcinucid genus *Arachnothelphusa* Ng, 1991, especially with regard to the relatively ovate carapace and long ambulatory legs. *Arachnothelphusa* species, however, do not have a frontal median triangle and the G1 is more slender, with the terminal segment

straight cylindrical and with only short scattered setae (Ng 1991).

The cave where *B. phasma* n. sp. was collected is part of the main gallery in Gua Kambing, and has numerous swiftlets living inside. Many parts of the cave floor were covered with moist guano and there are numerous grasshoppers (Raphidophoridae), gnats, heteropteran bugs and spiders present there (Degouve *et al.* 2002: 29). While *B. phasma* n. sp. has not been found outside caves, has a pale colouration in life and the pereopods are elongated; it does not have the reduced eyes and/or pigmentation associated with true troglobites. It is probably like several other troglaphiles in Borneo that are closely associated with caves but not completely adapted to a wholly cavernicolous lifestyle (Guinot 1988; Ng 1989, 2013). Elsewhere in Borneo, two completely or almost completely blind potamids (*Cerberusa* Holthuis, 1979) are known (Holthuis 1986), while one gecarcinucid species of *Stygothelphusa* Ng, 1989, has reduced eyes (Ng & Grinang 2014). All three species are from Sarawak, Malaysia.

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